

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte SHYAM S. BAYYA, GUILLERMO R. VILLALOBOS,  
JASBINDER S. SANGHERA, and ISHWAR D. AGGARWAL

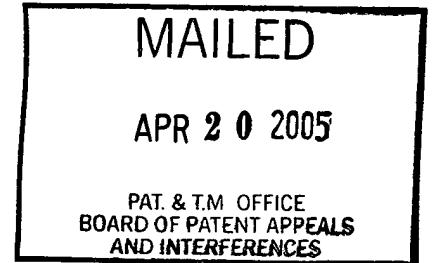
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Appeal No. 2005-0630  
Application No. 09/699,396

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ON BRIEF

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Before KIMLIN, HANLON, and OWENS, Administrative Patent Judges.  
HANLON, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the final rejection of claims 1, 3-8, 10-13 and 15-20, all of the claims pending in the application. The claims on appeal are directed to a method for coating solid particles, including phosphor particles, for use in field emission displays. Claim 1 is representative of the subject matter on appeal and reads as follows:

1. A method for coating solid particles comprising the steps of

(a) adding solid particles to a liquid coating solution to form a liquid coating slurry containing a coating precursor, solvent for the precursor and the solid particles dispersed therein whereby the precursor material is not precipitated until after spraying,

(b) spraying the coating slurry to form droplets containing at least one particle,

(c) passing the droplets through a zone where the droplets are dried and form dry coated particles wherein the coating material is formed from the precursor, and

(d) heat treating the coating material on the particles to remove volatile matter from the coating material.

The references relied upon by the examiner are:

Hanneman et al. (Hanneman)	5,063,267	Nov. 5, 1991
Strom et al. (Strom)	5,087,607	Feb. 11, 1992
Chau	5,196,229	Mar. 23, 1993
Okabe et al. (Okabe)	5,609,911	Mar. 11, 1997
Petersen	5,747,100	May 5, 1998
Anderson et al. (Anderson)	5,800,922	Sep. 1, 1998
Ohoshi et al. (Ohoshi)	5,949,184	Sep. 7, 1999

Masters, Spray Drying Handbook 1-7, 21, 30-1, 54-5, 144-47, 150-51, 178-79, 212-13, 272-93, 320-33 (John Wiley & Sons, New York, 4<sup>th</sup> ed., 1985).

The following rejections are at issue in this appeal:<sup>1</sup>

(1) Claims 1, 3 and 13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Petersen, Strom, Anderson and Okabe.

(2) Claims 3-8, 12 and 15-19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Petersen, Strom, Anderson, Okabe and Masters.

(3) Claims 10 and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Petersen, Strom, Anderson, Okabe, Masters, Hanneman and Chau.

(4) Claim 11 is rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Petersen, Strom, Anderson, Okabe, Masters, Hanneman, Chau and Ohoshi.

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<sup>1</sup>In the Answer, the examiner indicates that an amendment filed on October 23, 2003, has been entered. Answer, p. 2. In that amendment, claim 14 was canceled and claims 5, 16, 17 and 20 were amended. It appears that claims 5, 16 and 17 were amended to overcome a rejection under 35 U.S.C. § 112, second paragraph, and claim 20 was amended to overcome a rejection under 35 U.S.C. § 112, first paragraph. Therefore, those rejections are considered withdrawn. Finally, in the Answer, the examiner indicates that the rejection of claims 1, 3-8, 11-13 and 15-19 under 35 U.S.C. § 112, first paragraph, is withdrawn. Answer, p. 2.

### Grouping of claims

According to appellants, "[a]ll claims stand or fall together." Brief, p. 4.<sup>2</sup> Therefore, for purposes of appeal, the patentability of claims 3 and 13 stands or falls with the patentability of claim 1, the patentability of claims 4-8, 12 and 15-19 stands or falls with the patentability of claim 3, the patentability of claim 20 stands or falls with the patentability of claim 10, and the patentability of claim 11 stands alone. See 37 CFR § 1.192(c)(7) (2003); 37 CFR § 41.67(c)(vii) (2004); see also In re McDaniel, 293 F.3d 1379, 1384, 63 USPQ2d 1462, 1466 (Fed. Cir. 2002) (applicant has the right to have each contested ground of rejection reviewed and measured against the scope of at least one claim within the group of claims subject to that ground of rejection).

### Discussion

#### A. Rejection of claims 1, 3 and 13

Claims 1, 3 and 13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Petersen, Strom, Anderson and Okabe. The prima facie case of obviousness is set forth on pages 3 through 5 of the Answer.

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<sup>2</sup>Reference to the "Brief" in this Decision on Appeal is to the "Second Revised Appeal Brief" dated October 23, 2003.

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The examiner explains that (Answer, p. 4):

Petersen '100 teaches

(a) adding solid particles to a liquid coating solution to form a liquid coating slurry (col. 6, lines 41-45) containing a coating precursor (e.g., salts of Zn, Ga, and Gd), dissolved in water (i.e., a solvent for the precursor) (col. 6, lines 23-37) and the solid particles (col. 6, lines 41-45);

(b), (c) spray drying (i.e., spraying the coating slurry to form at least some droplets that contain at least one particle and passing the droplets through a zone where the droplets are dried) to form particles coated with a coating material (col. 6, lines 45-47);

(d) heat treating the coating material to react the precursors to form a final coating material (col. 6, lines 50-62). The step must inherently remove any remaining solvent, as well as the reaction byproducts that do not form part of the oxide coating (that is, volatile matter).

Appellants argue, and the examiner agrees, that precipitation occurs before spraying in the method disclosed in Petersen (Answer, p. 4):

The process of Petersen '100 is a sol-gel process (col. 5, lines 36-45). '100 indicates that the coating solution is heated to increase the viscosity (col. 6, lines 35-41) before initiating the coating (e.g., spray drying) process. Applicant has [sic, Applicants have] argued that the increase in viscosity is caused by the gellation [sic, gelation] (i.e., precipitation) of the sol-gel mixture (see amendment filed 2/26/2003, paragraph bridging pp. 7-8), and the examiner agrees with this interpretation of the reference.

However, the examiner relies on Strom, Okabe and Anderson to establish what one of ordinary skill in the art would have understood about gelation in spray drying processes (Answer, pp. 4-5):

Strom '607 teaches a spray drying method in which particles of metal oxides are prepared from metal-containing precursors, such as metal nitrates (Examples) and that precipitation is avoided in the solution before spray drying by adding nitric acid to the solution (col. 21, lines 38-42). However, '607 does not discuss why precipitation is avoided.

In the background of Okabe '911, limitations of spray drying processes are discussed. Okabe '911 warns that in spray drying processes, coating uniformity may be adversely affected by gellation [sic, gelation] (col. 1, lines 35-39 and col. 1, line 65-col. 2, line 4). Also, Anderson '922 warns that gellation [sic, gelation] of spray drying compositions may render the composition unpumpable (and therefore unfit for spraying) (col. 2, lines 13-30).

The examiner concludes that (Answer, p. 5):

[T]aking the references as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have prevented any gellation [sic, gelation] or precipitation (e.g., via the precipitation-preventing method of Strom '607) in the slurry of Petersen '100 before spray drying in order to have avoided destroying the flow properties of the solution, and in order to have produced a more uniform coating for the reasons taught by Okabe '911 and Anderson '922.

Appellants argue that delaying precipitation of the precursor until after spraying as in the claimed invention results in the unexpected result of a particle lifetime in excess of 10,000 hours of continuous operation without a loss of 50% of the particle's original brightness. Appellants argue that none of the references discloses or suggests this "unexpected result." Brief, p. 5.

In their brief, appellants do not point to any evidence which establishes that the claimed invention achieves unexpected results. See In re Lindner, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972) ("arguments unsupported by factual evidence are insufficient to establish unexpected results"). A review of appellants' specification reveals that Figure 3 is described as showing that "coated phosphors easily exceed the present standard of up to a 50% reduction in brightness over 10,000 hours of usage." See Specification, p. 16, lines 3-10. However, Figure 3 compares aging of coated ZnS:Ag phosphor particles with aging of uncoated ZnS:Ag phosphor particles, not phosphor particles coated according to the method disclosed in Petersen. See In re De Blauwe, 736 F.2d 699, 705, 222 USPQ 191, 196 (Fed. Cir. 1984) (an applicant relying on a comparative showing to rebut a prima facie case of obviousness must compare his invention with the

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closest prior art). Furthermore, we note that claim 1 is not limited to a method for coating phosphor particles. See In re Lindner, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972) (evidence of nonobviousness must be commensurate in scope with the claims).

Appellants further argue that Petersen leads away from the claimed invention because precipitation occurs before the spraying step in Petersen. See Brief, p. 6.

Significantly, one cannot show nonobviousness by attacking a reference individually where the rejection is based on a combination of references. In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). Thus, Petersen must be read, not in isolation, but for what it fairly teaches in combination with the prior art as a whole.

In this case, the examiner recognizes that precipitation occurs before spraying in the method disclosed in Petersen. However, the examiner relies on the teachings of Okabe and Anderson to illustrate the disadvantages of gelation in spray drying processes and Strom to illustrate how precipitation may be avoided. Appellants do not address these teachings but rather, argue that the references, either alone or in combination, do not disclose or suggest delaying precipitation to prolong the



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lifetime and brightness of coated particles. Brief, p. 8. Manifestly, the motivation to combine Petersen, Okabe, Anderson and Strom need not be identical to appellants' motivation to establish obviousness. In re Kemps, 97 F.3d 1427, 1430, 40 USPQ2d 1309, 1311 (Fed. Cir. 1996).

Appellants also argue that Petersen, Strom, Okabe and Anderson are from nonanalogous arts and therefore are not combinable. Brief, p. 9.

We disagree. In In re Wood, 599 F.2d 1032, 1036, 202 USPQ 171, 174 (CCPA 1979), the Court set forth the following test for determining whether a reference is from an analogous art:

First, we decide if the reference is within the field of the inventor's endeavor. If it is not, we proceed to determine whether the reference is reasonably pertinent to the particular problem with which the inventor was involved.

Petersen is within the field of appellants' endeavor, i.e., coating phosphor particles, and Strom, Okabe and Anderson are reasonably pertinent to the particular problem with which appellants are involved, i.e., spray drying of gelable compositions. See Answer, p. 10. Therefore, Petersen, Strom, Okabe and Anderson are each from an art analogous to the claimed invention and are combinable. See In re Gorman, 933 F.2d 982,

986, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991) (in resolving the question of obviousness under 35 U.S.C. § 103, it is proper to consider references in an analogous art).

For the reasons set forth above, appellants have failed to rebut the prima facie case of obviousness set forth by the examiner on pages 3 through 5 of the Answer. See In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984) ("[a]fter a prima facie case of obviousness has been established, the burden of going forward shifts to the applicant"). Therefore, the rejection of claim 1 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Petersen, Strom, Okabe and Anderson is affirmed. Since claims 3 and 13 stand or fall with the patentability of claim 1, the rejection of claims 3 and 13 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Petersen, Strom, Okabe and Anderson is also affirmed.

B. Rejection of claims 3-8, 12 and 15-19

Claims 3-8, 12 and 15-19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Petersen, Strom, Anderson, Okabe and Masters. The prima facie case of obviousness is set forth on pages 5 through 6 of the Answer.

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Appellants argue that Masters does not teach or suggest delaying precipitation for any reason. See Brief, pp. 9-10. However, it is not critical that Masters does not discuss delaying precipitation. The examiner merely relies on Masters to establish that spray drying is typically performed by spraying feed into a heated atmosphere of 90-125°C to aid in the drying process. Answer, p. 5. See Keller, 642 F.2d at 425, 208 USPQ at 881 (a rejection premised upon a proper combination of references cannot be overcome by attacking the references individually). Appellants do not argue that Masters was inappropriately applied for this reason.

Appellants have failed to rebut the prima facie case of obviousness set forth on pages 5 through 6 of the Answer. Piasecki, 745 F.2d at 1472, 223 USPQ at 788. Therefore, the rejection of claim 3 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Petersen, Strom, Anderson, Okabe and Masters is affirmed. Since claims 4-8, 12 and 15-19 stand or fall with the patentability of claim 3, the rejection of claims 4-8, 12 and 15-19 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Petersen, Strom, Anderson, Okabe and Masters is also affirmed.

C. Rejection of claims 10 and 20

Claims 10 and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Petersen, Strom, Anderson, Okabe, Masters, Hanneman and Chau. The prima facie case of obviousness is set forth on pages 6 through 8 of the Answer.

Appellants argue that Hanneman and Chau have "nothing to do with delaying precipitation." See Brief, p. 10. However, it is not critical that Hanneman and Chau have nothing to do with delaying precipitation. The examiner merely relies on Hanneman to establish that formation of silica barriers via decomposition of silica precursors is well known and Chau to establish that formation of silica films by decomposition of ethyl silicates, particularly tetraethyl orthosilicate (TEOS), is known. Answer, p. 8. See Keller, 642 F.2d at 426, 208 USPQ at 882 (a rejection premised upon a proper combination of references cannot be overcome by attacking the references individually). Appellants do not argue that Hanneman and Chau were inappropriately applied for these reasons.

Appellants have failed to rebut the prima facie case of obviousness set forth on pages 6 through 8 of the Answer. Piasecki, 745 F.2d at 1472, 223 USPQ at 788. Therefore, the

rejection of claim 10 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Petersen, Strom, Anderson, Okabe, Masters, Hanneman and Chau is affirmed. Since claim 20 stands or falls with the patentability of claim 10, the rejection of claim 20 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Petersen, Strom, Anderson, Okabe, Masters, Hanneman and Chau is also affirmed.

D. Rejection of claim 11

Claim 11 is rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Petersen, Strom, Anderson, Okabe, Masters, Hanneman, Chau and Ohoshi. The prima facie case of obviousness is set forth on pages 8 through 9 of the Answer.

Appellants argue that Ohoshi is not analogous to the claimed invention and therefore is not combinable with the other references. See Brief, p. 10. To the contrary, Ohoshi relates to field emission displays (FEDs) and discloses that ZnS:Ag, Cl phosphors are suitable for use therein. Compare Ohoshi, col. 1, lines 5-7 and col. 9, lines 39-42 with appellants' specification, p. 2, line 15-p. 3, line 6 and p. 3, line 20-p. 4, line 10.

Appellants also argue that Ohoshi does not disclose or suggest delaying precipitation during a coating process. Brief, p. 11. However, the examiner merely relies on Ohoshi to

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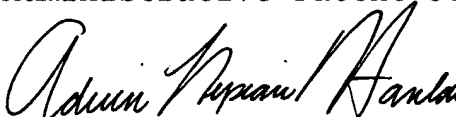
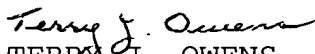
establish that ZnS:Ag, Cl is a suitable phosphor in a field emission display. Answer, p. 12. See Keller, 642 F.2d at 426, 208 USPQ at 882 (a rejection premised upon a proper combination of references cannot be overcome by attacking the references individually).

Appellants have failed to rebut the prima facie case of obviousness set forth on pages 8 through 9 of the Answer. Piasecki, 745 F.2d at 1472, 223 USPQ at 788. Therefore, the rejection of claim 11 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Petersen, Strom, Anderson, Okabe, Masters, Hanneman, Chau and Ohoshi is affirmed.

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No time period for taking any subsequent action in  
connection with this appeal may be extended under 37 CFR  
§ 1.136(a).

AFFIRMED

	)	
EDWARD C. KIMLIN	)	
Administrative Patent Judge	)	
	)	
ADRIENE LEPIANE HANLON	)	BOARD OF PATENT
Administrative Patent Judge	)	APPEALS AND
	)	INTERFERENCES
	)	
TERRY J. OWENS	)	
Administrative Patent Judge	)	

ALH:hh

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